

FATAL INJURIES AT WORK



MASSACHUSETTS FATALITY UPDATE, 2006

Every year, men and women in a wide variety of jobs and industries throughout Massachusetts are fatally injured at work. These deaths are all the more tragic because they are largely preventable. Information about where and how they occur is essential in order to develop effective prevention programs. In Massachusetts, the Occupational Health Surveillance Program (OHSP) in the Massachusetts Department of Public Health (MDPH) collects information on fatal occupational injuries as part of the national Census of Fatal Occupational Injuries (CFOI), conducted in cooperation with the Bureau of Labor Statistics (BLS), US Department of Labor.

OHSP also conducts in-depth investigations of fatal occupational injuries as part of the national Fatality Assessment and Control Evaluation (FACE) project, sponsored by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the FACE project is to develop a detailed understanding of how fatal injuries occur and to identify effective countermeasures to prevent similar incidents in the future. Excerpts from selected FACE investigations are highlighted in this report.

This update provides an overview of fatal injuries at work that occurred in Massachusetts during 2006. These include fatalities traditionally linked to the work environment such as falls, electrocutions, and exposure to toxic chemicals. They also include workplace homicides and suicides as well as motor vehicle-related fatalities that occurred during travel on the job. Deaths resulting from occupational illnesses and heart attacks at work are excluded from this fatality update.

OVERVIEW OF FATAL INJURIES AT WORK IN 2006

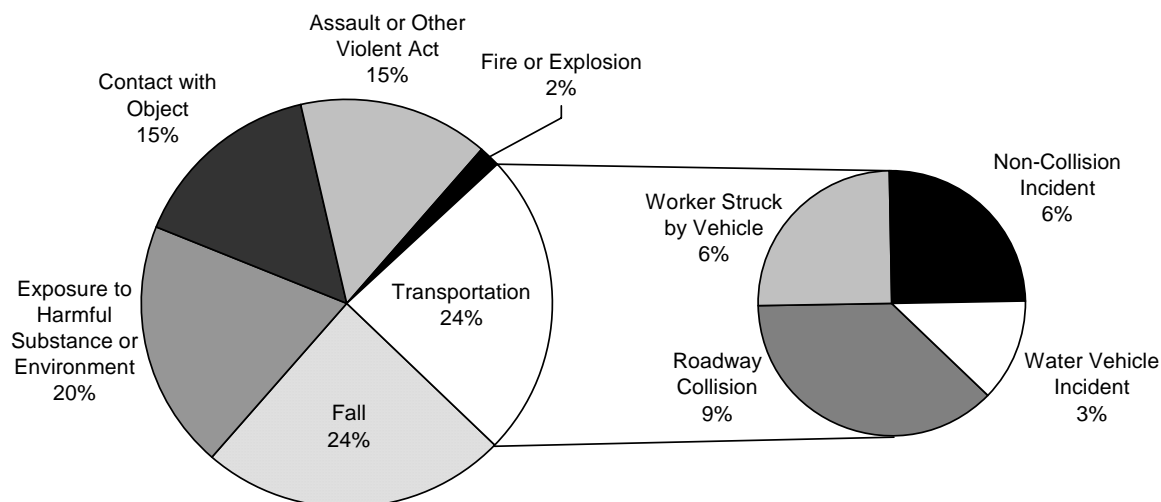
- In Massachusetts, 66 individuals were fatally injured at work during 2006; 62 were men and four were women.¹ The annual rate of fatal occupational injury in Massachusetts for 2006 was 2.1 deaths per 100,000 workers. This rate is consistent with fatal occupational injury rates for Massachusetts reported for the previous few years.
- The victims ranged in age from 17 to 89 years, with an average age of 42 years. The 66 fatalities resulted in a total of 2,002 potential life years lost, an average of 30 potential life years lost per death. Potential life lost is the difference between the victim's age and 75 years.
- Fifty-seven victims (86%) were White non-Hispanic. Seven victims (11%) were Hispanic, five of whom were foreign born. The rate of fatal occupational injury among White non-Hispanics was 2.1 deaths per 100,000 workers, and the rate among Hispanic workers was 3.7 deaths per 100,000 workers.
- Eleven victims (17%) were born outside of the US. Four of these workers were from Central or South America and three were from Brazil. Foreign-born victims worked in a range of industries. The rate of fatal injury among foreign-born workers was 2.0 per 100,000 workers, similar to the rate among US-born workers (2.1 per 100,000 workers).
- Nine were self-employed.² Four of the nine self-employed victims died while working in landscaping or tree removal services. The fatal injury rate among self-employed workers was 2.7 deaths per 100,000 workers while the rate among wage/salary earners was 2.0 deaths per 100,000 workers.
- Twenty-five victims (38%) worked in small employer establishments (with 10 or fewer employees). Eleven of those victims worked in construction, six of whom were fatally injured at residential construction sites.

¹ Work-related deaths in 2006 were identified as of 1/1/07.

² Self-employed workers include persons who work in unincorporated family businesses.

EVENTS RESULTING IN FATAL INJURIES

**Figure 1. Fatal Injuries at Work by Event/Exposure
Massachusetts 2006, N = 66**



Source: Massachusetts Census of Fatal Occupational Injuries

Transportation-related incidents accounted for 16 deaths (24%). These incidents involved workers in a wide variety of industries including transportation & material moving, warehousing, retail trade, protective service, and construction/extraction. Four victims were workers struck by vehicles in roadways, parking lots, or off-road areas. Six workers were vehicle occupants who were fatally injured in roadway collisions. Four victims fell from a ship, truck, or tractor, and two victims were injured when the industrial vehicles they were operating overturned.³

Falls resulted in 16 workers' deaths (24%). **Falls to a lower level** accounted for the majority of these fatal falls, claiming 13 workers' lives and resulting in more fatalities than any other single event in 2006. These included four falls from scaffolds/girders, four from roofs, four from porches, window ledges, trees and one down steps. Two-thirds (8/12) of fatal falls to lower levels were from heights of 25 feet or less (Range: 5 to 130 feet).⁴

Exposure to harmful substances or environments resulted in the deaths of 13 workers (20%). Five workers died from electrocutions and other injuries resulting from contact with electric current. Two of these five workers were electricians.³ Three of these five fatalities involved the source (aluminum siding, utility bucket, tensioned wire) being electrified by contact with overhead power lines. Three workers succumbed to carbon monoxide poisoning, and three other workers died as a result of drowning or decompression sickness.

Contact with objects or equipment claimed the lives of 10 workers (15%). Five workers were struck or compressed by dislodging vehicles, machinery, or machinery parts (winch, counterweight). Two were pinned by material moving machinery (forklift, excavator), two were struck by felled trees, and one was crushed under building debris.³

Assaults and other violent acts accounted for 10 deaths (15%); seven were workplace homicides and three were suicides at work. Five of the seven homicide victims worked in food, accommodation or hospitality services. In the three previous years (2003-05), the majority of the workplace homicides had robbery as the motive; however, in 2006, none of the homicides resulted from robbery. The crime perpetrators were patrons and current/former co-workers. Workplace homicides accounted for four percent of all homicides among working age residents of Massachusetts in 2006.⁵

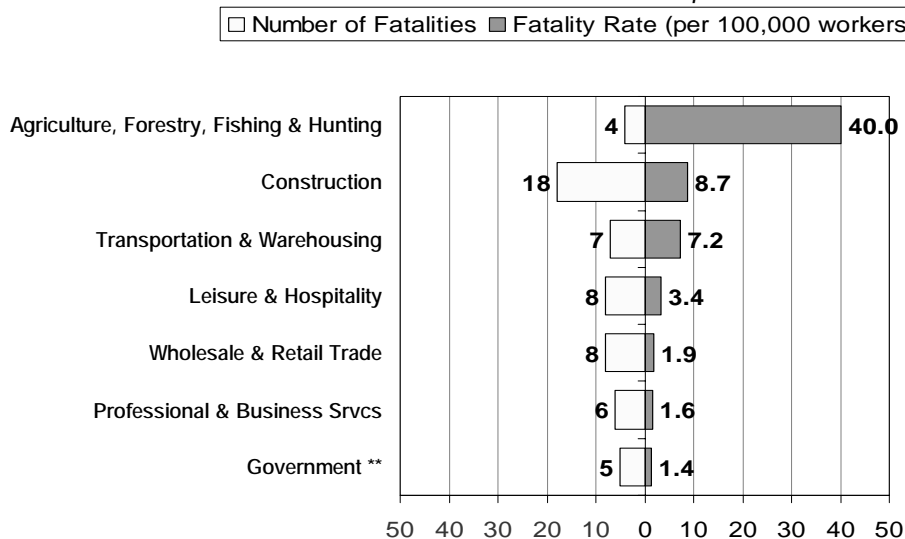
³ Data provided by the Fatality Assessment and Control Evaluation (FACE) Project, Massachusetts Dept. of Public Health.

⁴ Height information was not available for one fatal fall to a lower level.

⁵ Massachusetts Violent Death Reporting System (MAVDRS), preliminary 2006 File7_08, Injury Surveillance Program, Massachusetts Dept. of Public Health.

FINDINGS BY INDUSTRY

**Figure 2. Number and Rate⁶ of Fatal Injuries at Work by Industry Division⁷
Massachusetts 2006, N=66**



Note: Data not presented for six industry divisions with fewer than four fatalities (N = 10 deaths).

**The Government category includes fatalities sustained by public sector workers regardless of industry.

Source: Massachusetts Census of Fatal Occupational Injuries

The **Agriculture, Forestry, Fishing & Hunting** industry had four fatalities (6%) and the highest occupational fatality rate (40 deaths per 100,000 workers) during 2006. Two of the victims in this industry sector were commercial fishers and the remaining two were agricultural workers.³

The **Construction** industry had the highest fatality count with 18 deaths (27%) and the second highest occupational fatality rate (8.7 deaths per 100,000 workers). One-third of victims employed in construction were born outside of the US. Eleven victims (61%) were employed by small contractors with 10 or fewer employees. The leading cause of death among construction workers was a fall from height (N=8). Four construction workers fell from scaffolds, and three fell from roofs.

The **Transportation and Warehousing** industry had seven fatalities (11%) and the third highest fatality rate (7.2 deaths per 100,000 workers). A fall from height accounted for three of the seven deaths in this industry.

Workers in the **Leisure & Hospitality** industry accounted for eight of the deaths in 2006 (12%). Homicide was the leading cause of death among these workers (N=5); three of the five homicide victims worked at nightclubs.

The **Wholesale & Retail Trade** industry had eight deaths (12%) with a fatality rate of 1.9 deaths per 100,000 workers. Of the victims, four were employed in retail and four worked in wholesale trade. Three of the eight workers in this industry were truck drivers fatally injured in highway motor vehicle collisions.

Six workers employed in the **Professional & Business Services** industry were fatally injured at work in 2006. This is a broad industry division that includes, for example, waste management/remediation, landscaping, employment and facilities management and scientific and technical services. Three of the six victims worked in landscaping services and were felling trees when they died.

⁶ To maintain consistency with denominator data, fatalities among military personnel (0) and workers under 16 years of age (0) were excluded from the numerator in rate calculation.

⁷ Industry definitions based on the 2002 North American Industry Classification Structure (NAICS), The Office of Management and Budget.

Five local, state, and federal **Government** workers sustained fatal injuries in 2006. Three of these workers died in transportation incidents. Two were struck by vehicles; one victim, a municipal worker, was struck by a minivan in an unmarked work zone and the other victim, a federal employee, was hit by a trailer truck at a loading platform.³ The third victim sustained fatal injuries when his police cruiser collided with an unoccupied dump truck in the highway breakdown lane.³ Refer to the excerpt from the FACE Report below for a more detailed description of the work zone fatality.

A Municipal Worker Struck by a Motor Vehicle While Patching a Pothole – Massachusetts
Massachusetts FACE Report 06MA027

A 39-year-old municipal utility worker was fatally injured while patching a pothole located on the edge of a roadway in a residential area at night. Two days before the incident, a trench had been dug in the roadway to access utility pipes and then filled in and patched. On the night of the incident, the victim was notified that a pothole had formed at the trench location during a rain storm. He responded to the scene in a backhoe. Working alone, with no traffic control devices, the victim was standing in front of the backhoe's bucket, filling the pothole, when a minivan struck him, crushing him against the bucket. The municipal department where the victim worked had neither a health and safety program nor an individual in charge of health and safety. Employees received very little health and safety training. The victim had been an employee of the department for 14 years.

To prevent similar incidents Massachusetts FACE recommendations included that municipalities should:

1) ensure that work zones are set up, at a minimum, in accordance with the *Manual on Uniform Traffic Control Devices (MUTCD)*, Part 6, developed by the U.S. Department of Transportation Federal Highway Administration; 2) ensure that employees' exposure to moving traffic is minimized when working in and around streets and highways by developing temporary traffic control plans; 3) provide and ensure that employees wear appropriate personal protective equipment, including high visibility vests when working along roadways; 4) develop, implement and enforce a buddy system for employees working in roadways and around moving equipment; 5) develop, implement, and enforce a comprehensive safety program that includes training on hazard recognition and avoidance of unsafe conditions; 6) provide work environments that, at a minimum, meet all relevant Occupational Safety and Health Administration (OSHA) regulations and industry accepted standards of practice; and 7) consider the feasibility of purchasing and using automated machines for filling potholes.

OSHA ENFORCEMENT AND PENALTIES

The Occupational Safety and Health Administration (OSHA) investigated 31 (47%) of the fatal work-related injuries that occurred in Massachusetts during 2006. Of the remaining 35 fatal incidents, 16 occurred in workforce groups that fall outside of OSHA jurisdiction such as commercial fishers, public sector employees, sole proprietors, or the self-employed, and 15 were events not routinely addressed by OSHA such as homicides, suicides, airplane/railway incidents, or roadway motor vehicle-related collisions.

OSHA levied fines for violations of health and safety standards against 24 of the 30 employer establishments they investigated.⁸ In Massachusetts in 2006, the agency assessed a total of \$506,950 in initial penalties, with the lowest fine assessed at \$1,500 and the highest at \$119,000.

⁸ One establishment that OSHA fined had one incident that resulted in two fatalities in this time period.

COMMENTS

It is important when reporting summary information about fatal occupational injuries to acknowledge the individuals that these numbers represent. These deaths were tragic incidents that were largely preventable. The surveillance findings presented here are intended to guide government, industry, labor, and community organizations in developing and implementing strategies to prevent similar tragedies in the future.

Nationwide, 5,840 workers died as a result of traumatic work-related injuries in 2006, and the annual rate of fatal occupational injury was 4.0 deaths per 100,000 workers.⁹ This rate is substantially higher than the annual rate of 2.1 deaths per 100,000 workers for Massachusetts. The lower fatality rate in Massachusetts is explained in part by differences in the industrial composition of the Commonwealth's workforce as compared with that of the nation. Nationwide, proportionately more workers were employed in high risk industries such as agriculture, mining and heavy manufacturing. In 2006, Massachusetts also had lower overall rates of fatal highway transportation incidents and homicides, two events that contributed substantially to the national fatality burden. Fatal occupational injury rates computed excluding homicides and highway-related deaths reduced but did not eliminate the gap between the state and national rates (1.7 deaths per 100,000 Massachusetts workers verses 2.7 deaths per 100,000 US workers).

Continued efforts are needed to reduce the human and economic toll of preventable deaths at work in the Commonwealth. Findings in this update highlight several specific issues to be addressed.

The **construction industry** in Massachusetts has continued to have both high numbers and high rates of fatal occupational injuries over time. In 2006, one-third of the construction industry deaths were among workers employed by small contractors with 10 or fewer employees who were working at residential sites. Forty-four percent of all construction deaths were due to falls. Innovative efforts are needed to reach these employers and workers, as well as the homeowners who employ them. Massachusetts FACE disseminates fall prevention materials in multiple languages through local building permit offices and is currently facilitating discussions among stakeholders representing labor, insurers, academic researchers, community organizations and other government agencies, to identify and collaborate on strategies to reduce falls in construction.

The three deaths resulting from **carbon monoxide poisoning** in 2006 underscore the hazards of using gas-powered equipment in enclosed spaces. The FACE Project has developed and disseminated a Safety Alert on carbon monoxide poisoning to distributors and manufacturers of power washing equipment and generators, marinas, residential contractors, inspection services, and fire departments. (Full sized, color copies of the Alert in both English and Spanish are available; refer to the contact and material request information on the next page.) There were more fatal **electrocutions** in Massachusetts in 2006 (N=5) than in any other single year since 1992. These deaths remind us that the hazards associated with electricity still need to be addressed, especially those hazards involving contact with overhead power lines which accounted for 41% of the electrical-related deaths in Massachusetts from 1991 through 2006. The FACE Project issued a Safety Alert describing the hazards and safe procedures associated with working near energized power lines. (Full sized, color copies of this Alert in English, Spanish, and Portuguese are available; refer to the contact and material request information on the next page.)

The high fatal occupational injury rate among **Hispanic workers** should be interpreted with caution because it is based on a small number of deaths and imprecise Massachusetts workforce counts. However, it is consistent with national findings¹⁰ and with the disproportionate concentration of Hispanic workers in higher risk jobs. Other factors contributing to high fatality rates in this population include language, literacy, and cultural barriers at work, inexperience, and fear of discrimination and socioeconomic pressure that make workers hesitant to speak up about workplace hazards and safety concerns.^{11,12} Lack of information about health and safety rights and resources is also a likely factor. In a 2002 MDPH study based on interviews with over 1,400 community health center patients, 71% of the Hispanic/Latin American patients had not heard of OSHA, and almost half (49%) were unaware of the workers' compensation system and its benefits.¹³

⁹ U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2006.

¹⁰ Work-related Injury Deaths Among Hispanics – United States, 1992-2006. MMWR, 57(22): 597-600. June 6, 2008.

¹¹ Frumkin H. Pransky G. (1999), Special Populations in Occupational Health. *Occup Med: State of the Art Reviews*, 4(3):479-84.

¹² Azaroff L. Levenstein C. Wegman D. (2002), Occupational Injury and Illness Surveillance: Conceptual Filters Explain Underreporting. *Am. J Pub Health*, 92(9): 1421-29.

¹³ Occupational Health and Community Health Center Patients: a report on a survey conducted at five Massachusetts CHCs (2007), Occupational Health Surveillance Program, Massachusetts Department of Public Health.

The Massachusetts FACE Project investigates work-related fatalities of Hispanic and immigrant workers to understand the circumstances and hazards that put these workers at risk and make recommendations to employers on ways to prevent these incidents from happening in the future. FACE also works with community partners to target outreach and educational efforts to the Hispanic community. Currently, FACE is providing custom data, technical assistance, and educational materials to "Protección en Construcción: Lawrence Latino Safety Partnership," a NIOSH-funded partnership with UMASS Lowell, the Lawrence Mayor's Health Task Force, Laborers Local 175, and JSI Inc. to prevent falls and silica exposure among Latino construction workers around Lawrence, Massachusetts.

Fact Sheet on Workers' Compensation Death Benefits Available

The Occupational Health Surveillance Program, in collaboration with the Massachusetts Department of Industrial Accidents, recently developed a fact sheet describing workers' compensation benefits for spouses and dependents of workers fatally injured at work. This fact sheet is available at www.mass.gov/Eeohhs2/docs/dph/occupational_health/next_kin_benefits.pdf.

A more extensive guide describing workers' rights and benefits under the Massachusetts workers' compensation system (in English, Portuguese, and Spanish) is available at www.mass.gov/dph/ohsp.

CONTACT / MATERIAL REQUEST INFORMATION

For detailed tables of fatal occupational injuries in 2006, previous fatality update reports as well as FACE Facts and Safety Alerts, please contact the Massachusetts Department of Public Health, Occupational Health Surveillance Program, 250 Washington Street, 6th Floor, Boston, MA 02108-4619. Reports are available online at www.mass.gov/dph/face or by calling 1-800-338-5223.

OTHER HEALTH AND SAFETY RESOURCES IN MASSACHUSETTS

- ❖ Massachusetts Division of Occupational Safety – Offers free consultation services to help employers improve their safety and health programs and train employees.
www.mass.gov/dos/consult
- ❖ Massachusetts Department of Industrial Accidents – Has grants available for providing workplace health and safety training to employers and/or employees in companies covered by the Massachusetts Workers' Compensation Insurance Law.
www.mass.gov/dia/safety

ACKNOWLEDGEMENTS

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FACE Facts

SAFETY ALERT

Occupational Health Surveillance Program
Massachusetts Department of Public Health
November 2007



Carbon Monoxide Poisoning

From 2005 through 2006, six workers died as a result of carbon monoxide (CO) poisoning while at work in Massachusetts, including:

- In 2005, two tile installers, a 48-year-old male and a 52-year-old female, died from CO poisoning while installing tile in a home under construction; there was a gasoline-powered generator operating in the garage and a propane heater operating in the house.
- In 2006, a 54-year-old male mechanic died from CO poisoning while sitting in a box truck's cab with a gasoline-powered generator operating in the back of the truck.
- In 2006, a 43-year-old male finish carpenter died from CO poisoning while working inside a metal storage container with a gasoline-powered generator operating to power a light.
- In 2006, a 38-year-old male dock worker died from CO poisoning while using a gasoline-powered pressure washer to clean a freshwater tank on a fishing vessel.

As with most work-related fatalities, these deaths could have been prevented.

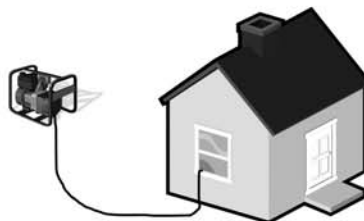
What is Carbon Monoxide?

Carbon monoxide (CO) is a poisonous, colorless, odorless and tasteless gas produced by burning fuel, such as gasoline, kerosene, oil, propane, coal or wood. When fuel-burning equipment, tools and appliances are used in enclosed places, or places without good ventilation, CO levels can build up quickly.

Carbon monoxide can build up quickly and overcome you in minutes without warning and cause unconsciousness and death.

Common sources of CO in the workplace are fuel-burning equipment, tools and appliances. Some examples are:

Forklifts	Concrete saws
Generators	Space heaters
Pressure washers	Compressors



Place fuel-burning equipment outdoors, away from open windows, doors and vents.

How to prevent CO poisoning in the workplace:

- Avoid using fuel-burning equipment indoors or in enclosed or partially-enclosed spaces, such as inside houses, garages, crawl spaces, basements, storage areas and tanks.
- Place fuel-burning equipment outdoors away from windows, doors or vents which could allow CO to enter and build up in the work area.
- Use tools powered by electricity, batteries, or compressed air when working indoors.
- If fuel-burning equipment must be used indoors, be sure to vent equipment exhaust outdoors and provide fresh air ventilation to the work area. Even with doors and windows open, CO levels from fuel-burning equipment can still reach dangerously high levels quickly.

In addition, employers should:

- Identify all potential sources of CO and locations where CO poisonings could occur.
- Provide training to workers in recognizing CO sources, as well as signs and symptoms of CO exposure.
- Install CO monitors with audible alarms in workplaces where fuel-burning appliances, tools, engines or generators are located and used. If it is not possible to have fixed CO monitors in a workplace, provide workers with personal CO monitors with audible alarms when working in areas where they may be exposed to CO.

Please report work-related fatalities immediately to the
Toll-Free Occupational Fatality Hotline

1-800-338-5223

or

Fax 617-624-5696

When reporting a fatality, include the following information:

- Your name, organization, address, and phone number
- Victim's name, occupation, and employer
- Brief description of the incident, including date and time

The Occupational Health Surveillance Program would like to thank all agencies and people that contribute to our efforts in preventing work-related deaths by reporting fatalities and providing information during our fatality investigations.

**Occupational Health Surveillance Program
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